



## **WATER RESOURCES RESEARCH GRANT PROPOSAL**

Influence of Soil Structural Heterogeneity on Transport of Fecal Pathogens and Solutes within the Vadose Zone

Duration 9/30/96-9/30/97, with possible renewal for period 9/30/97-9/30/98

Federal Funds Requested (1996/97) Total: \$32,569 Direct: \$32,569

Non-Federal Funds Allocated (1996/97) Total: \$65,139 Direct: \$48,405 Indirect: \$16,734

Name, Universities, and Water Resource Institutes of PI's

Ed Perfect, Mark S. Coyne, Robert L. Blevins  
Department of Agronomy  
University of Kentucky  
Lexington, KY  
Virgil L. Quisenberry  
Department of Agronomy and Soil  
Clemson University  
Clemson, SC 29634

Congressional District of University Performing the Research 6th

### **Statement of the Critical Regional Water Problems**

Increasing use of agricultural chemicals and excessive application rates of animal wastes to soils pose a threat to groundwater quality in the Southeast/Island Region. To manage these non-point sources of pollution it is necessary to be able to predict transport processes within the unsaturated (vadose) zone underlying agricultural fields. Bacterial and solute contaminants that are not lost in runoff must pass through this zone to reach the groundwater. However, current models to predict transport processes in the vadose zone are unsatisfactory because they were developed without regard for soil structure. Research is urgently needed on quantitative methods characterize soil structure, and on the inclusion of structural parameters into models to predict the transport of water, solutes and fecal pathogens within the vadose zone.

### **Statement Of Result Benefits and/or Other Information Expected:**

We will relate spatial variability in the transport of water, solutes and fecal pathogens to new quantitative parameters characterizing soil structure. These parameters can be obtained from easily measured soil physical properties using pedotransfer functions. The results should lead to an increased predictive capability for contaminant transport in structured soils. This capability could then

be used to develop best management practices for agricultural chemicals and animal wastes applied on structured soils. If implemented, such practices would lead to reduced non-point sources of pollution and improvements in the quality of both ground and surface waters.